Mark scheme for 1MA1 Higher themed papers: Median and Quartiles

GCSE Mathematics (1MA1)

Themed papers – Median and Quartiles

Compiled from student-friendly mark schemes

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

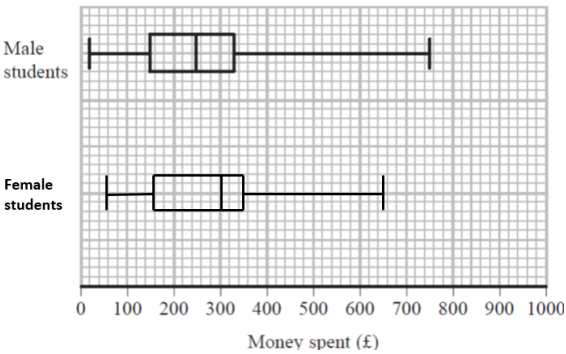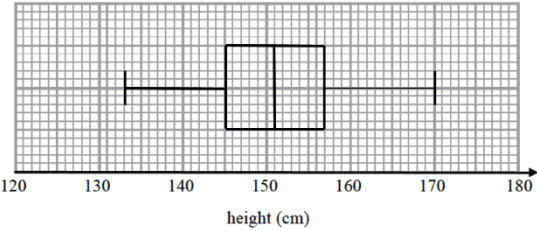| **Guidance on the use of codes within this mark scheme** |
| --- |
| M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.

P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.

A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.

C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer). |

Question 1 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	59, 53, 66	B2	This mark is given for a correct median, lower quartile and upper quartile (B1 is given for one value correct)
(b)	Yes; all the values are lower for Coach A so the people on that coach are younger	C1	This mark is given for a correct statement with a valid reason
(c)	No; there is a greater difference between the greatest and lowest age on Coach B	C1	This mark is given for a correct statement with a valid reason

Question 2 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	330 – 150	M1	This mark is given for evidence of using values for the lower quartile (150) and the upper quartile
	180	A1	This mark is given for the correct answer only
(b)		B2	These marks are given for a fully correct box plot (one mark is for showing a box and at least 3 correctly plotted values)
(c)	Yes, because the female students have a greater median than the male students	C1	This mark is given for a correct comparative statement relevant to the question

Question 3 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	height (cm)	B3	These three marks are given for a fully correct box plot
			(Two marks are given for at least three correctly plotted values, including box and whiskers)
			(One mark is given for at least two correctly plotted values, including box and whiskers or 5 correct values with no box and whiskers)
(b)	$\dfrac{3}{4} \times 80$		This mark is given for a method to find an estimate
	60		This mark is given for the correct answer only

Question 4 (Total 3 marks)

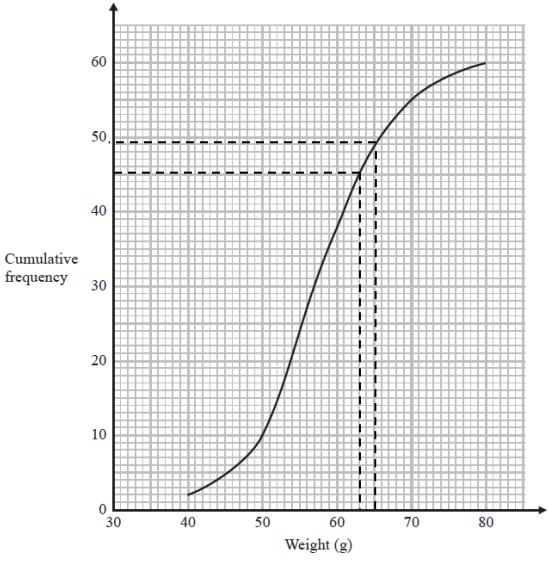| Part	Working or answer an examiner might expect to see	Mark	Notes
	$(1 \times 7.5) + (2 \times 12.5) + (7 \times 17.5) + (8 \times 22.5)$ $= 7.5 + 25 + 122.5 + 180$	M1	This mark is given for a method to find four products within the intervals
	$\dfrac{335}{18}$	M1	This mark is for a method to find $\sum ft \div 18$
	18.6	A1	This mark is given for a correct answer in the range 18.61 to 18.62

Question 5 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$40 < h \le 50$	B1	This mark is given for the correct answer only
(b)		B2	This mark is given for a correct polygon with points plotted at midpoints (B1 is given for one point incorrect)

Question 6 (Total 5 marks)
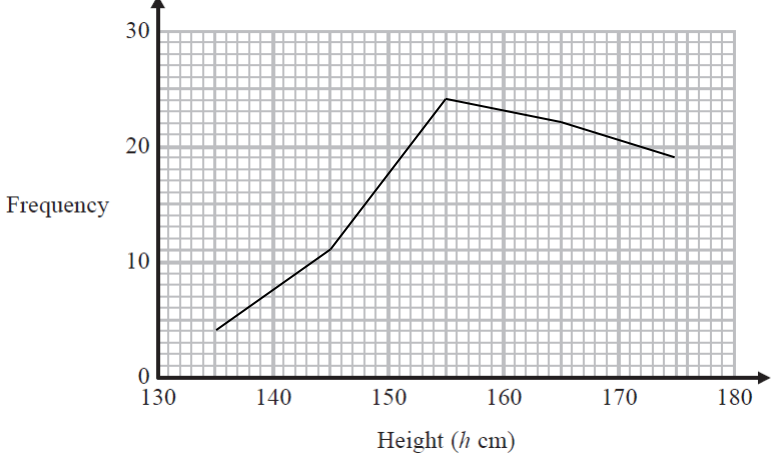
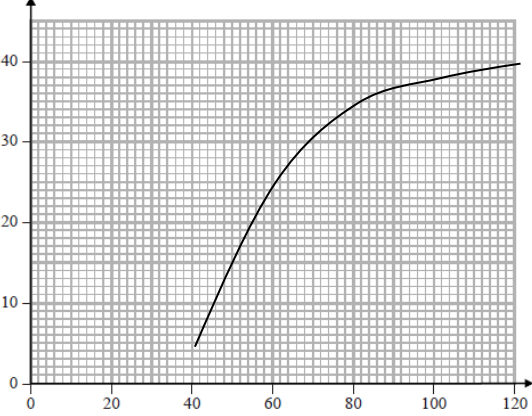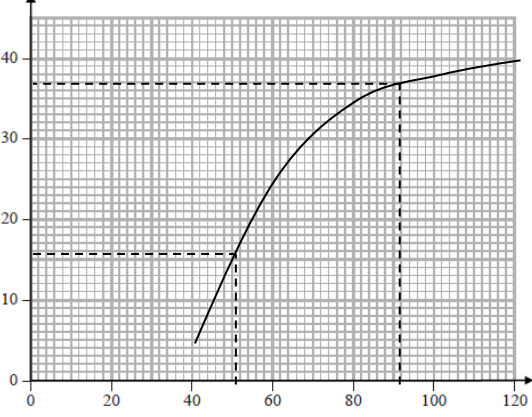| Part	Working an or answer examiner might expect to see	Mark	Notes
(a)	UQ = 168 Highest value = 174	1	This mark is given for finding the upper quartile or the highest value
	Lowest value = 154 LQ = 161 Median = 165	1	This mark is given for a box plot shown with at least three correctly plotted values from those shown
		1	This mark is given for the correct answer only
(b)	The median height of Year 7 girls is smaller than that of Year 11 girls	1	This mark is given for a statement making a comparison of the medians, in context
	Year 11 girls have a smaller range of heights than Year 7 girls	1	This mark is given for a statement making a comparison of the spreads, in context

Question 7 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	57	1	This mark is given for the correct answer only
(b)	Not necessarily, since the maximum weight might be less than 80 and the minimum weight less than 40	1	This mark is given for a correct explanation
(c)		1	This mark is given for reading the graph at weight 65 (=49) and at cumulative frequency 45 (= 63)
	25% of 60 would be 15 potatoes, but only 11 have a weight of 65g (so less than 25%)	1	This mark is given for a correct explanation
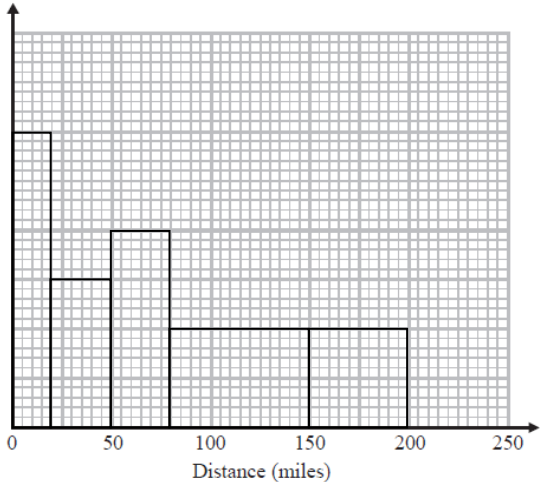
Question 8 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$160 < h \leq 170$	1	This mark is given for the correct answer only
(b)		2	These marks are given for a fully correct frequency polygon with line segments joining the points (135, 4), (145, 11), (155, 24), (165, 22) and (175, 19) (1 mark is given if any points are incorrect)
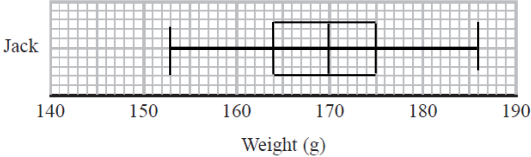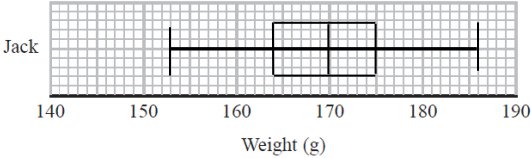
Question 9 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		C2	These marks are given for a correct cumulative frequency graph through (40, 5), (60, 25), (80, 35), (100, 38) and (120, 40) (C1 is given for at least 4 points plotted)
(b)	Upper quartile = 68 Lower quartile = 44	M1	This mark s given for an upper or lower quartile identified (± 2)
	68 – 44 = 24	A1	This mark is given for an answer in the range 20 to 28
(c)		M1	This mark is given for a method to find the difference between readings taken from the readings of points from a mark of 50 and a mark of 90
	$\dfrac{37-16}{40} = \dfrac{21}{40}$	A1	This mark is given for a correct answer in the range $\dfrac{19}{40}$ to $\dfrac{23}{40}$

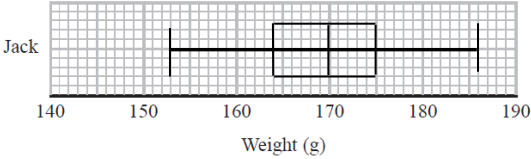**Question 10 (Total 5 marks)**

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		B3	These marks are given for a fully correct histogram (B2 is given for all four blocks correct or all six frequencies) (B1 is given for at least 2 blocks of different widths or at least three correct frequencies)
(b)	$50 + \dfrac{285 - 210}{330 - 210} \times (80 - 50) = 50 + 18.75$	M1	This mark is given for a an indication of the median line in the third interval on the histogram or a proportional method to indicate the median distance
	68.75	A1	This mark is given for a correct answer in the range 65 to 70

Question 11 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	166 – 158 = 8	B1	This mark is given for a correct answer only
(b)		C1	This mark is given for at least 2 correctly plotted values, including box or whiskers / tails, or 5 correct values and no whiskers / tails
		C1	This mark is given for at least 2 correctly plotted values including box and whiskers / tails
	Fully correct box plot drawn (minimum = 153, lower quartile = 164, median = 170, upper quartile = 175, maximum = 186)	C1	This mark is given for a fully correct box plot
(c)		C1	This mark is given for a correct comparison of medians
		C1	This mark is given for a correct comparison of a measure of spread For the award of both marks, at least one of the comparisons must be interpretative
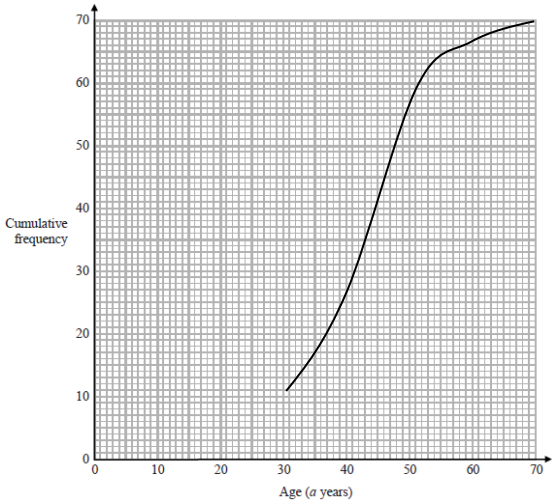
Question 12 (Total 2 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	Median plotted incorrectly	B1	This mark is given for a correct reason
	Range plotted rather than maximum or maximum nor plotted	B1	This mark is given for a correct reason

Question 13 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$(7\frac{1}{2}$ squares – 4 squares) represent 7 fish; so each square represents 2 fish	M1	This mark is given for working with frequency density
	10, 8, 12, 15, 15, 8	M1	This mark is given for finding at least 4 of 10, 8, 12, 15, 15, 8
	10 + 8 + 12 + 15 + 15 + 8 = 68	A1	This mark is given for the correct answer only
(b)(i)		M1	This mark is given for a complete correct method to divide the area of the histogram into two equal parts or for a complete correct method to interpolate for the 34.5th value
	412 – 417	A1	This mark is given for the correct answer only answer within the range 412 – 417
(b)(ii)	Only an estimate because it is dependent on a distribution within the interval	C1	This mark is given for a correct statement.

Question 14 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)		B1	This mark is given for at least 4 points plotted correctly (30, 10), (40, 26), (50, 58), (60, 66), (70, 70)
		B1	This mark is given for points joined by a curve (though accept straight lines)
(b)	43	B1	This mark is given for an answer in the range 41–45
(c)	15 people aged less than 35 years 7 people aged more than 55 years	M1	This mark is given for taking readings at 35 and 55 years
	63 − 15 = 48 people 60% of 70 people = 42 people	M1	This mark is given for working out the number of people between 35 and 55 years old
	Yes, Francesco is correct	C1	This mark is given for a correct conclusion supported by working

Question 15 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a) (i)	for a fully correct box plot	B1	This mark is given for a fully correct box plot drawn
(ii)	smallest value 20, lower quartile 170 and median 200	B1	This mark is given for the correct values shown in the table
(b)	2 statements	C2	for two comments one about median and one about IQR; one must be in context (i.e. reference to number of lorries)
		(C1	For 1 comment about IQR or median

Question 16 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$20 < t \leq 30$	B1	This mark is given for a correct answer only
(b)	Points plotted at (5,10), (15,26), (25,23), (35,19), (45,14), (55,8) and joined with line segments	B2	Two marks are given for correct plotting of 6 points and joining with line segments
		(B1	1 mark is given for points plotted at midpoints of intervals or joining points with line segments at the correct heights and consistent within the class interval (including end values) or correct frequency polygon with one point incorrect or correct frequency polygon with first and last points joined)

Mark scheme for 1MA1 Higher themed papers: Median and Quartiles

Performance data:

Q	Taken from			Total Marks available	TOPIC	Spec Ref	AO	% Mean marks	Edexcel mean averages Marks of candidates who achieved grade:										
	Q	Series	Paper						ALL	9	8	7	6	5	4	3	2	1	U
1a	11a	June 2019	1H	2	Statistics	S2	1	76	1.52	1.84	1.72	1.62	1.52	1.41	1.25	1.03	-	-	0.82
1b	11b	June 2019	1H	1	Statistics	S4	2	59	0.59	0.77	0.70	0.65	0.60	0.54	0.44	0.31	-	-	0.21
1c	11c	June 2019	1H	1	Statistics	S4	2	64	0.64	0.86	0.81	0.75	0.67	0.56	0.40	0.22	-	-	0.12
2a	9a	June 2017	3H	2	Statistics	S4	2	74	1.47	1.88	1.78	1.67	1.54	1.36	1.05	0.63	-	-	0.29
2b	9b	June 2017	3H	2	Statistics	S3	2	95	1.9	1.97	1.96	1.94	1.92	1.89	1.83	1.62	-	-	1.11
2c	9c	June 2017	3H	1	Statistics	S4	2	60	0.6	0.75	0.68	0.63	0.59	0.57	0.52	0.45	-	-	0.31
3a	10a	June 2018	1H	3	Statistics	S4	2	97	2.91	2.99	2.98	2.97	2.96	2.92	2.83	2.59	-	-	1.86
3b	10b	June 2018	1H	2	Statistics	S4	2	41	0.82	1.76	1.42	1.1	0.79	0.53	0.31	0.17	-	-	0.1
4i	4i	Nov 2019	2H	2	Statistics	S1	3	83	1.66	2	1.92	1.95	1.9	1.81	1.62	1.45	-	-	1.08
4ii	4ii	Nov 2019	2H	1	Statistics	S1	3	43	0.43	0.89	0.73	0.72	0.67	0.54	0.32	0.22	-	-	0.18
5a	3a	June 2019	3H	1	Statistics	S2	2	70	0.7	0.95	0.9	0.83	0.73	0.59	0.42	0.25	-	-	0.17
5b	3b	June 2019	3H	2	Statistics	S2	2	69	1.38	1.81	1.68	1.55	1.41	1.22	0.99	0.73	-	-	0.46
6a	12a	Nov 2017	1H	3	Algebra	A14 A15	2	45	0.89	2	1.79	1.68	1.43	1.35	0.98	0.62	-	-	0.4
6b	12b	Nov 2017	1H	2	Algebra	A15	2	41	0.41	0.88	0.94	0.82	0.77	0.68	0.47	0.26	-	-	0.12
7a	11a	Nov 2017	3H	1	Statistics	S3 S4	2	39	0.39	0.88	0.71	0.69	0.64	0.56	0.42	0.32	-	-	0.15
7b	11b	Nov 2017	3H	1	Statistics	S3 S4	2	1	0.01	0.12	0.06	0	0.01	0.01	0.01	0.01	-	-	0.01
7c	11c	Nov 2017	3H	2	Statistics	S3	2	35	0.7	1.75	1.47	1.2	1.3	0.99	0.77	0.51	-	-	0.27
8a	1a	Nov 2017	3H	1	Statistics	S2 S4	2	24	0.24	0.75	0.88	0.8	0.58	0.44	0.23	0.11	-	-	0.05
8b	1b	Nov 2017	3H	2	Statistics	S4	2	47	0.94	1.25	1.21	1.14	1.28	1.03	1.02	0.9	-	-	0.63
9a	10a	Nov 2019	1H	2	Statistics	S3	2	41	0.82	1.78	1.51	1.29	1.04	0.79	0.76	0.61	-	-	0.53
9b	10b	Nov 2019	1H	2	Statistics	S4	2	14	0.28	1.67	1.14	0.92	0.61	0.26	0.15	0.03	-	-	0.01
9c	10c	Nov 2019	1H	2	Statistics	S3 P3	2	12	0.24	1	1.14	0.75	0.45	0.22	0.14	0.05	-	-	0.01

10a	17a	Nov 2018	3H	3	Statistics	S3	2	22	0.66	2.6	1.74	1.72	1.61	0.93	0.42	0.1	-	-	0.06
10b	17b	Nov 2018	3H	2	Statistics	S3	1	17	0.33	1.2	1.12	0.64	0.49	0.37	0.28	0.21	-	-	0.14
11a	11a	Mock Set 1	3H	1	-	-	-	-	-	-	-	-	-	-	-	-	11a	-	-
11b	11b	Mock Set 1	3H	3	-	-	-	-	-	-	-	-	-	-	-	-	11b	-	-
11c	11c	Mock Set 1	3H	2	-	-	-	-	-	-	-	-	-	-	-	-	11c	-	-
12	13	Mock Set 2	2H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13a	18a	Mock Set 2	3H	3	-	-	-	-	-	-	-	-	-	-	-	-	-	18a	-
13b	18b	Mock Set 2	3H	3	-	-	-	-	-	-	-	-	-	-	-	-	-	18b	-
14a	9a	Mock Set 3	3H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	9a	-
14b	9b	Mock Set 3	3H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	9b	-
14c	9c	Mock Set 3	3H	3	-	-	-	-	-	-	-	-	-	-	-	-	-	9c	-
15a	11a	Mock Set 4	2H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15b	11b	Mock Set 4	2H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16a	3a	Mock Set 4	3H	1	-	-	-	-	-	-	-	-	-	-	-	-	16a	3a	-
16c	3b	Mock Set 4	3H	2	-	-	-	-	-	-	-	-	-	-	-	-	-	3b	-
				70					**20.53**	**34.35**	**30.99**	**28.03**	**25.51**	**21.57**	**17.63**	**13.40**	**-**	**-**	**9.09**